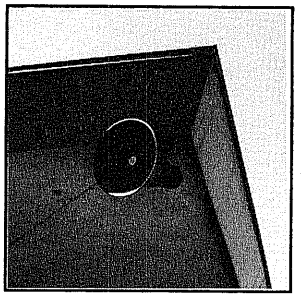
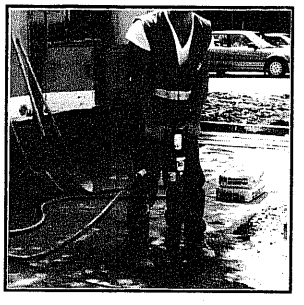
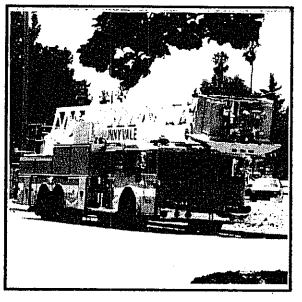
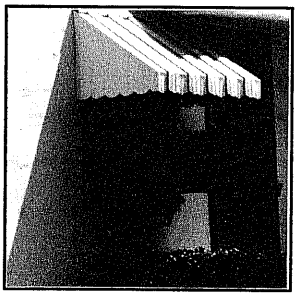
Department of Community Development

CITY OF SUNNYVALE







The Sub-Element complies with California Government Code Section 65302 (f) and was adopted by the Sunnyvale City Council by Resolution Number 119 - 97 on March 25, 1997

NOISE

SUB-ELEMENT OF THE GENERAL PLAN

ACKNOWLEDGEMENTS

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PREFACE

Noise is defined as unwanted sound. Freedom from excessive noise is one measure of the quality of life. As part of the Environmental Management Element of Sunnyvale's General Plan, the Noise Sub-Element identifies sources of noise in Sunnyvale and strategies for reducing the negative impact of noise.

The State of California requires cities and counties to consider noise in their plans, policies and actions. In 1971, the California Legislature amended the California Planning Law to require a Noise Element as part of the General Plan. The State also issued Noise Element guidelines in 1976. Of all General Plan regulations, those pertaining to Noise Elements are among the most specific in terms of content and method of preparatio n.

Noise is defined as unwanted sound.

Sunnyvale's first Noise Element was adopted in 1972. The Noise Sub-Element was last updated in 1986. Since then, noise conditions have changed. This update assesses current and future conditions, and identifies strategies for living with noise.

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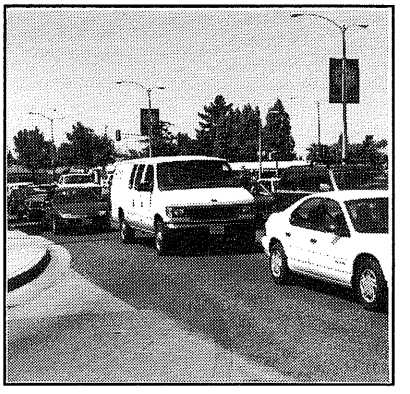
EXECUTIVE SUMMARY

Introduction

Noise is a significant and inherent part of Sunnyvale's environment. The noise environment is a result of historical land use decisions, competing regional and community goals, geographic reasons and limited local controls. The City's residents and businesses must tolerate some noise. Excessive noise, however, can cause physical and mental health problems. A legitimate public concern is, therefore, to protect residents from excessive noise.

Acceptable levels of noise vary from land use to land use. Both the state and federal government have developed guidelines for evaluating the compatibility of various land uses with noise. The federal government has prepared noise and land use compatibility guidelines for air bases. The state guidelines were originally developed in 1976 and presented in a document titled *Guidelines for the Preparation of the Noise Element in the General Plan*. These guidelines have been periodically updated since then.



Roadways are the major source of transportation noise.

Transportation facilities are Sunnyvale's main source of noise, and the most difficult to control. Roadways are the major source of transportation noise, followed by Moffett Federal Airfield, the CALTRAIN corridor and San Jose International Airport. Year 2010 predicted noise levels are depicted in the Noise Condition Map in Appendix A.

Noise from land use operations and single-events, such as air conditioners and leaf blowers, are an ongoing concern. These noise problems are discussed generally in this Sub-

Element. Land Use operational noise and some single-event noises are regulated by the Sunnyvale Municipal Code.

Purpose

The Noise Sub-Element is both a problem statement and an integrated set of goals, policies and actions. The Noise Sub-Element describes the noise environment in Sunnyvale and identifies strategies for living with noise. The strategies will guide decision makers confronted with issues and proposals. The fundamental purpose of the Noise Sub-Element is to:

The Noise Sub-Element is both a problem statement and an integrated set of goals, policies and actions.

- provide information on the current and future noise environment in Sunnyvale so that noise can be effectively considered in the land use planning process;
- preserve areas within Sunnyvale that have an acceptable noise environment;
- describe cost effective strategies for abating excessive noise in the community; and
- utilize the Noise Condition Map of the Sub-Element to identify areas that require further study and mitigation measures to comply with State Noise Insulation Standards.

The Noise Sub-Element is one of 24 sub-elements in Sunnyvale's General Plan. Its goals and policies must be considered in the context of other local goals. The Noise Sub-Element shares a particularly close relationship with the Land Use and Transportation Element. The land use portion of the Land Use and Transportation Element describes the location, type and intensity of land use activities in Sunnyvale. These activities generate and receive noise. The Noise Sub-Element identifies noise issues caused by land use and addresses those issues with policies and action statements. The transportation portion of the Land Use and Transportation Element lays out the City's street,

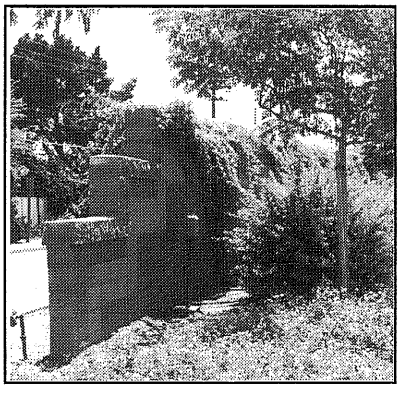
expressway and freeway system. These facilities along with aircraft and trains are the main source of noise in Sunnyvale. The Noise Sub-Element identifies noise issues that result from transportation and suggests ways to address them.

Major Findings

The following findings are based on the Community Conditions section and they form the basis of the goals, policies and action statements in this Sub-Element.

1. State and federal noise guidelines and standards have proven to be reasonable for determining land use compatibility with the noise environment. Most existing and future land uses in Sunnyvale comply with these standards and guidelines.

2. Major roadways cause most of the ambient noise in Sunnyvale. In 1986, before sound walls were installed, approximately 41% (8,630 homes) of single-family homes experienced "conditionally acceptable"[1] noise levels (60-75 dBA Ldn) and 1% (270 homes) of single-family homes experienced "unacceptable" noise levels (greater than 75 dBA Ldn) resulting from roadway noise. Between the years 1986 and 1996, sound walls were completed along Interstate 280, U.S. Highway 101, State Highway 85 and along many major local roadways, substantially reducing noise levels in communities near those roadways. Based on roadway traffic projections, there are no significant changes (3 dBA or greater) expected to occur between the years 1996 and 2010 in Sunnyvale as a result of roadway noise. In the year 2010, the percentage of single-family homes experiencing "conditionally



Between the years 1986 and 1996, sound walls were completed along Interstate 280, U.S. Highway 101, State Highway 85 and along many major local roadways, substantially reducing noise levels in communities near those roadways.

[1] For definitions of "normally acceptable", "conditionally acceptable" and "unacceptable", see Table 2, page 13 of the *State of California Noise Guidelines for Land Use Planning, Summary of Land Use Compatibility for Community Noise Environment.*

acceptable" noise levels is predicted to be 20% (5343 homes). The percentage of homes experiencing "unacceptable" noise levels is predicted to be less than .1% (24 homes) in the year 2010.

3. Despite the traffic noise, noise levels are "normally acceptable"[2] for most homes today, and most homes will continue to have normally acceptable noise levels in the future. Non-residential uses will generally be unaffected by current and future traffic noise.

4. The major roadway noise contributors to residential areas in Sunnyvale are the freeway system, Mathilda Avenue, Wolfe Road, Lawrence Expressway, El Camino Real and Homestead Road. Although Mary Avenue, Hollenbeck Road, Fremont Avenue, and Remington Drive are relatively quiet roads, they do subject a large number of residences to some noise exposure. Since Central Expressway is mostly below grade, it is not considered a substantial noise contributor. Because sound walls have been installed along Sunnyvale-Saratoga Road, this roadway is not considered a major noise contributor to residential areas.

5. The future use of Moffett Federal Airfield will have a significant effect on the noise environment in Sunnyvale. The City does not have authority to determine what the National Aeronautic and Space Administration (NASA) may ultimately decide to do with the future use of Moffett Federal Airfield. The City has adopted policies to define the City's interest regarding Moffett Field and what means the City will use to influence federal decision makers to adopt policies and/or undertake

Noise levels of individual aircraft events will eventually stabilize and decrease as Stage 3 (quieter aircraft) become prevalent.

[2] Ibid.

activities compatible with the City's defined interests.

6. Residents in northeast Sunnyvale are affected by San Jose International Airport flight patterns. Operations have doubled since 1985 and are forecasted to more than double again between 1995 and 2010. Noise levels of individual aircraft events will eventually stabilize and decrease as Stage 3 (quieter aircraft) become prevalent. Current and forecasted future noise levels are below state limits.

7. Commuter and other train operations affect noise levels in central Sunnyvale. Current noise levels are acceptable for all but older homes near the tracks. Future noise levels may noticeably increase, thereby worsening the environment of those homes. State and local noise standards can protect new residential uses from excessive noise levels. Current and future train noise levels are generally acceptable for nonresidential uses.

Commuter and other train operations affect noise levels in central Sunnyvale.

8. Noise from land use operations (air conditioners, loading docks, etc.) is regulated by the Municipal Code and discretionary land use permits. An October 1995 -review (RTC No. 95-402 "Noise Ordinance Review") determined that operational noise regulations are effective.

9. The Sunnyvale Municipal Code regulates some single-event noises such as nuisance animal noises (barking dogs), delivery hours of commercial or industrial establishments that are adjacent to residential zoning districts, and hours of operation of powered equipment (such as leaf blowers) that are adjacent to residential zoning districts. The City, however, cannot regulate all single-event noises and

usually mediates complaints by relying on generally stated public disturbance regulations.

10. Barriers, setbacks, site planning and building design practices are useful techniques for reducing the impact of noise. Each technique has benefits and shortcomings.

Summary of Goals and Policies

This section lists the goals and policies contained in this Sub-Element. The goals and policies as well as the supporting action statements are included in the section titled *"Goals, Policies and Action Statements of the Noise Sub-Element"* on pages 53 - 63 of this Sub-Element.

GOAL 3.6A
MAINTAIN OR ACHIEVE A COMPATIBLE NOISE ENVIRONMENT FOR ALL LAND USES IN THE COMMUNITY (LAND USE COMPATIBILITY).

Policy 3.6A.1 Prevent significant noise impacts from new development by applying state noise guidelines and Sunnyvale Municipal Code noise regulations in the evaluation of land use issues and proposals.

Policy 3.6A.2 Enforce and supplement state laws regarding interior noise levels of residential units.

Policy 3.6A.3 Consider techniques which block the path of noise and insulate people from noise.

GOAL 3.6B

PRESERVE AND ENHANCE THE QUALITY OF NEIGHBORHOODS BY MAINTAINING OR REDUCING THE LEVELS OF NOISE GENERATED BY TRANSPORTATION FACILITIES (TRANSPORTATION NOISE).

Policy 3.6B.1	Refrain from increasing or reduce the noise impacts of major roadways.
Policy 3.6B.2	Support efforts to reduce or mitigate airport noise.
Policy 3.6B.3	Support activities that will minimize the noise impacts of Moffett Federal Airfield.
Policy 3.6B.4	Support activities that will minimize and/or reduce the noise impacts of San Jose International Airport.
Policy 3.6B.5	Encourage activities that limit the noise impacts of helicopters.
Policy 3.6B.6	Mitigate and avoid the noise impacts from trains.
Policy 3.6B.7	Monitor and mitigate the noise impacts of light rail facilities.

GOAL 3.6C

MAINTAIN OR ACHIEVE ACCEPTABLE LIMITS FOR THE LEVELS OF NOISE GENERATED BY LAND USE OPERATIONS AND SINGLE-EVENTS (COMMUNITY NOISE).

Policy 3.6C.1	Regulate land use operation noise.
Policy 3.6C.2	Regulate select single-event noises and periodically monitor the effectiveness of the regulations

COMMUNITY CONDITIONS

Introduction

Noise is unwanted sound. Sounds become unwanted when they disrupt the ability to talk, listen, learn, work, relax or sleep. Noise is an inherent part of urban life. At best, it is a minor irritant. At worst, it causes physical harm such as hearing loss, ulcers, high blood pressure and heart disease. It can also cause tension, frustration, violence and other mental health problems.

TYPES OF NOISES

Noise is an inherent part of urban life.

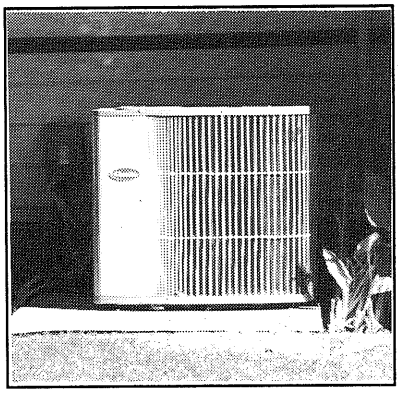
Basic types of noise are:

Ambient Noise - A relatively steady background noise which is an accumulation of different noise sources near and far. Most ambient noise in Sunnyvale is related to transportation. Other ambient noise sources include wind and chirping birds.

Single-event Noise - An unusual, occasional or temporary noise. Examples include:

- barking dogs
- loud stereos
- deliveries
- parking lot sweepers
- shouting
- construction work
- organized athletic, musical or other group events
- power equipment such as lawn mowers, leaf blowers and workshop tools

- burglar and fire alarms
- ice cream trucks
- handling of garbage cans
- emergency vehicles.



An air conditioner is an example of a continuous noise emitter related to the basic use of property.

Land Use Operational Noise - A continuous or frequent noise related to the basic use of property. Examples include:

- air conditioners
- loading docks
- pool pumps and filters
- restaurant loudspeakers
- roof equipment
- industrial machinery.

The discussion of noise in this Sub-Element as it relates to Sunnyvale is divided in two categories: transportation and community noise. Transportation noise, generated by roadway, aircraft, train and light rail facilities; is a major contributor to ambient noise in Sunnyvale. Community noise is considered to be everything other than transportation-related noise; and includes single-event and land use operational noise.

MEASURING NOISE

Sounds are measured in decibels (dB). The decibel scale is logarithmic with the following characteristics:

- a change of 1dB cannot generally be heard;
- a change of 3dB is a just noticeable difference;
- a change of 5dB is distinct;
- a change of 10dB is heard as a doubling of noise (e.g., 70dB is twice as loud as 60dB);
- combining two noises of the same decibel level will add 3dB to the resulting noise (e.g., two noises at 60dB add up to 63dB, not 120dB);

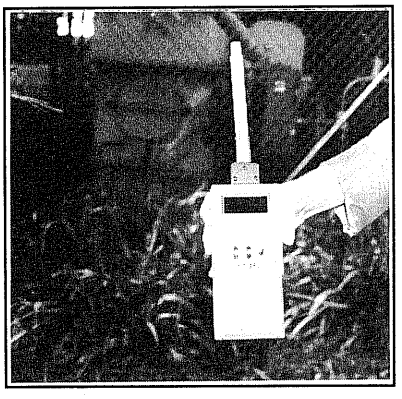
- combining two noises of different decibel levels will add less than 3dB to the loudest noise; and

- continued exposure to noise above 70dB may impair hearing.

Table 1 shows the decibel levels of common sounds.

Table 1 - Decibel Levels of Common Sounds

Noise Source (distance between source and listener)	Sound Level (dBA)	Subjective Impression
Civil Defense Siren (100')	130	
Jet Takeoff (200')	120	Threshold of Pain
Rock Music Concert	110	
Bus (15') Ambulance Siren (100')	100	Very Loud
Boiler Room Printing Press Plant	90	
Garbage Disposal (3') Freeway (100')	80	
Freight Cars (100')	70	Moderately Loud
Vacuum Cleaner (10') Department Store Speech (1')	60	
Light Traffic (100') Business Office	50	
Typical Home Interior; Typical Home Exterior, Nighttime	40	Quiet
Quiet Bedroom Soft Whisper (5')	30	
	20	
Mosquito (5')	10 5	Threshold of Hearing



A sound level meter is used to take an instantaneous decibel reading.

Instantaneous Noise Measurements

To measure environmental noise at any instant in time, acoustical engineers have used A and C weighted filters for approximately 30 years. The weighted measurements determine the "loudness" of a sound which is detected by the human ear. The A-weighted filter registers low, mid and high frequency noises associated with interference, loudness, community impact studies, and speech. The C-weighted filter is used when measuring impulsive sound such as artillery fire, explosions, quarry blasts and demolitions. Sunnyvale currently uses the dBA rating to enforce the noise regulations.

A sound level meter is used to take an instantaneous decibel reading. The resultant reading is the sound level (dBA) for an instant in time. Instantaneous decibel readings are required for all the noise descriptors discussed in this Sub-Element. In the case of the statistical descriptors and the day-night average sound level, numerous instantaneous readings are averaged over a stated period of time.

Instantaneous Noise Measurements and the Sunnyvale Municipal Code Noise Regulations

The maximum decibel levels for operational noise in the noise regulations of the Sunnyvale Municipal Code refer to instantaneous noise readings (as opposed to average noise Ldn readings). For the purpose of enforcing the noise regulations in the Sunnyvale Municipal Code, one or more instantaneous decibel readings are taken, usually at the property line of the property generating the noise.

MEASURING NOISE OVER A STATED PERIOD OF TIME

Measuring Daytime and Nighttime Noise

Noise levels are relatively constant from moment to moment, but change slowly from hour to hour. To account for human sensitivity to nighttime noise levels, noise descriptors have been developed that penalize sounds occurring in the evening and/or nighttime hours. Ldn and CNEL are two of

the most common noise descriptors that average noise levels over a 24-hour period. The CNEL descriptor is more sensitive to evening noise than Ldn. However, CNEL and Ldn result in almost identical readings. An Ldn reading can therefore be compared to a CNEL reading.

Ldn (day/night average sound level): The A-weighted average sound level in decibels during a 24-hour period. The 24-hour period is divided into daytime (7am - 10pm) and nighttime (10pm - 7am) periods. A 10 dBA penalty is applied to nighttime noise. The Ldn descriptor is used for all the noise measurements taken to develop the noise contours in the Year 2010 Noise Condition Map of this Sub-Element in Appendix A.

CNEL (Community Noise Equivalent Level): represents the A-weighted average continuous noise level in decibels over a 24-hour period. The 24-hour day is divided into three time periods: daytime (7am to 7 pm), evening (7pm to 10pm) and nighttime (10pm to 7am). A 5 dB penalty is applied to evening noises. A 10 dB penalty is applied nighttime noises. The State of California Aeronautics Law requires that CNEL be used for measuring noise contours around airports; therefore, CNEL is used for measuring potential airport noise for the Noise Contour Map in this Sub-Element in Appendix B.

Statistical Descriptors

To describe the time-varying character of environmental noise, the statistical descriptors L_{10}, L_{50}, and L_{90} are commonly used. They are the noise levels equaled or exceeded during 10%, 50% and 90% of the stated time period. A single number descriptor called L_{eq} is also widely used. The L_{eq} is the average noise level during a stated period of time. The hourly L_{eq} is used to develop the 24 hour Ldn. The acoustical studies that have been prepared for the City for specific sites use these descriptors to describe the existing and potential noise generated on the site over stated time periods.

REGULATING NOISE

What level of noise are people expected to tolerate in a residential, commercial or industrial environment? Residential uses are the most sensitive. Industrial uses are the most tolerant. Tolerance also depends on how loud the noise is, when and where it happens, the duration, frequency and tone of the noise, and the sensitivity of the person who hears the noise. People are generally most tolerant of existing ambient noise. They are least tolerant of single event noise, operational noise, and increases in ambient noise.

Noise regulations vary by land use due to different sensitivities to noise.

It isn't possible or reasonable to control all noises to which some people may object. However, a legitimate public concern is to protect people from excessive noise. Many communities respond to this issue by regulating noise through the community's municipal code. Noise regulations vary by land use due to different sensitivities to noise. Communities use noise regulations as guidelines for checking the compatibility of a particular use with existing and future noise levels. Noise regulations vary from community to community due to different development patterns, geography and priorities.

Excessive noise can be regulated at any of three stages:

(1) reduce the **source** of noise;
(2) block the **path** of noise, and
(3) insulate or remove the **receiver** of noise.

There are opportunities to improve some noise conditions, prevent others from getting worse, and protect acceptable noise conditions. However, the City's ability to protect people from excessive noise is restricted for the following reasons:

- Decisions made 30 - 50 years ago transformed Sunnyvale from an agricultural community into a military, aerospace and industrial center with transportation, housing and commercial support systems. These land use decisions resulted in a mix and intensity of urban activities and facilities which are inherently noisy.

- Protection from noise has generally been a lower priority than competing community goals, such as free-flowing traffic and more housing.

- Geography makes Sunnyvale a natural "crossroads" for South Bay traffic and its resulting noise (several State roads and highways, and county expressways traverse Sunnyvale).

- Sunnyvale has limited local control over transportation noise, the major source of noise in Sunnyvale.

Regulating noise is an intergovernmental issue. Federal, state and local governments share the responsibility for regulating noise. Understanding the powers of each level of government will help the City of Sunnyvale understand its capabilities of influencing control over the noise environment in Sunnyvale.

Federal Authority

Federal Aviation Regulations (FAR), Part 150 - Airport Noise Compatibility and Land Use Planning

The Federal Aviation Administration (FAA) has established the Federal Aviation Regulations (FAR) Part 150 to address noise at civilian airports. FAR Part 150 specifically addresses airport noise compatibility planning. These regulations prescribe the procedures, standards, and methodology governing the development, submission, and review of airport noise exposure maps and airport noise compatibility programs, including the process for evaluating and approving projects related to those programs. FAR Part 150 directs that noise contours for airports be developed using the FAA's Integrated Noise Model (INM) for developing standardized noise exposure maps and predicting noise impacts. The agency must identify incompatible land uses within the noise contours. FAR Part 150 review often leads to operational changes in a project to minimize or mitigate impacts.

Air Installation Compatible Use Zone (AICUZ) Study

In 1976, when the Navy operated Moffett Field, the U.S. Department of Defense prepared guidelines which identify suitable land uses in an area impacted by high noise and potential accidents. The guidelines are part of an Air Installation Compatible Use Zone (AICUZ) study. Noise contours were updated in 1982. The AICUZ Map displays federal guidelines for land uses near the Naval Air Station (NAS) at Moffett Field. Since the Navy no longer operates Moffett, the AICUZ study is considered an informational document. The complete AICUZ study and map can be reviewed at the City of Sunnyvale, Department of Community Development.

Guidelines for Considering Noise in Land Use Planning and Control

In June of 1980, the Federal Interagency Committee on Urban Noise published the *"Guidelines for Considering Noise in Land Use Planning and Control"*. The Interagency Committee was comprised of the five federal agencies most involved in noise, land use, or environmental policy: Department of Defense, Transportation, Housing and Urban Development, the Veterans Administration and the Environmental Protection Agency.

Trains

The Environmental Protection Agency (EPA) regulates noise levels of trains.

Roadways

The EPA regulates roadways where federal funding is involved or environmental review is required.

State Authority

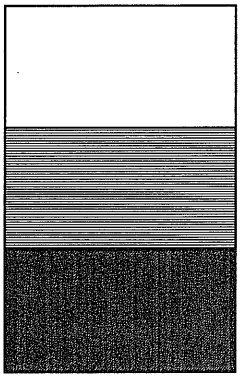
Noise Guidelines for Land Use Planning

In 1976, the State of California published guidelines for noise compatible land use planning. Generally, exterior noise exposures fall into four categories: normally acceptable, conditionally acceptable, normally unacceptable and unacceptable. Each land use has a particular dBA range within each exterior noise exposure category. Table 2 on page 17 of this Sub-Element summarizes these

guidelines. The City has not adopted these guidelines but does consider them in land use planning. Generally, the state guidelines have proven to be reasonable guidelines for determining land use compatibility.

Table 2 - State of California Noise Guidelines for Land Use Planning Summary of Land Use Compatibility for Community Noise Environment

Land Use Category	Exterior Noise Exposure LDN or CNEL, DBA					
	55	60	65	70	75	80
Residential, Hotels and Motels						
Outdoor Sports and Recreation, Neighborhood Parks and Playgrounds						
Schools, Libraries, Museums, Hospitals, Personal Care, Meeting Halls, Churches						
Office Buildings, Commercial and Professional Businesses						
Auditoriums, Concert Halls, Amphitheaters						
Industrial, Manufacturing, Utilities and Agriculture						



Normally Acceptable
Specified land use is satisfactory, based on the assumption that any buildings involved are of normal conventional construction, without any special insulation requirements.

Conditionally Acceptable
Specified land use may be permitted only after detailed analysis of the noise reduction requirements and needed noise insulation features are included in the design.

Unacceptable
New construction or development should generally not be undertaken because mitigation is usually not feasible to comply with noise element policies.

Noise Insulation Requirements (Title 24)

The California Code of Regulations protects interiors of new multi-family dwellings from excessive noise. These requirements apply to hotels, motels, townhomes, condominiums, apartments, group care homes, and all other dwellings except single-family detached homes. The law requires that:

- Interior noise levels cannot exceed an Ldn of 45dB with doors and windows closed; and,

- A residential site with an Ldn above 60dB needs a detailed noise study. The study must show how the dwelling will meet an interior Ldn of 45dB.

Note: Ldn is a time weighted average and is not comparable to an instantaneous decibel reading. See page 10 in this Sub-Element containing the section titled *"Measuring Noise Over a Stated Period of Time"*.

The City enforces Title 24 and also has the ability to impose its requirements on new single-family dwellings. A decision to do so could be adopted in conjunction with this Sub-Element.

Title 24 regulates average sound levels, not individual events. For residential units exposed to train or aircraft noise, the City could limit the interior noise level exposure of periodic loud events (train passbys and overhead aircraft). For instance, the City can adopt a maximum instantaneous noise level of 50dBA in bedrooms and 55dBA in other rooms.

Noise Element

California Government Code requires each city and county to prepare a Noise Element as part of the General Plan. Sunnyvale's first Noise Element was adopted in 1972. It was revised in 1986 and was subsequently called the "Noise Sub-Element" and included within the Environmental Management Element of the General Plan.

California Airport Noise Standards

According to the State Airport Noise Standards, the level of noise acceptable to a "reasonable" person residing in the vicinity of an airport is CNEL 65dBA. This criterion was chosen for persons residing in urban residential areas where houses are of typical California construction and may have windows partially open. The CNEL 65dBA level was selected with reference to speech, sleep and community reaction. The stated purpose of these standards is to provide a basis for resolving an existing noise problem in communities surrounding civil airports and to prevent the development of new noise problems. (Note: Military airports are not subject to the regulation. In addition, military aircraft operations are not counted when making a statutory determination of whether or not an airport is a "noise problem" airport. Moffett Federal Airfield is not subject to these standards but the standards do apply to San Jose International Airport.). All existing and future civil airports in California are subject to the regulation.

Environmental Review (CEQA)

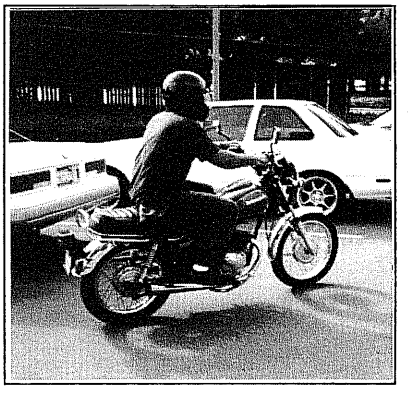
The California Environmental Quality Act (CEQA) requires that both private and public actions be evaluated for potential environmental impacts, including noise.

Disturbance Noise

When the City of Sunnyvale, Public Safety Department receives a noise complaint that is not explicitly covered by the Sunnyvale Municipal Code, the person perpetrating the noise can be cited under California Penal Code, Section 415(2). A citation could occur if an officer determines that the noise is done willfully and maliciously and if the noise is loud and unreasonable. The noise is often referred to by the Public Safety Department as "disturbing the peace".

Motor Vehicles

The State Vehicle Code requires motor vehicles to conform to specified noise regulations. Sunnyvale continues to enforce state muffler laws. The State Vehicle Code also specifies how loud a person's car stereo can play at a distance of 50 feet. The City cannot set noise limits for cars, trucks, motorcycles, off-road vehicles, trains or aircraft.



The City cannot set noise limits for cars, trucks, motorcycles, off-road vehicles, trains or aircraft.

Sunnyvale could choose to support legislation to reduce vehicle noise levels.

Occupational Noise
The California Occupational Safety and Health Act protects employees from industrial and equipment noise.

County Authority

Airport Land Use Commission (ALUC)
The Santa Clara County Airport Land Use Commission consists of seven members, seven alternates and two ex-officio members. Commissioners are appointed by the legislative bodies of the cities within Santa Clara County (including Sunnyvale) and by the County of Santa Clara. The ALUC prepares an Airport Land Use Commission Plan that provides for orderly growth of the area surrounding each public airport in Santa Clara County (San Jose International Airport, Palo Alto Airport, Reid-Hillview Airport, and South County Airport). The Plan is intended to minimize the public's exposure to excessive noise and safety hazards. The ALUC has established provisions for regulating land use, building height, safety and noise insulation within these areas that are adjacent to each of the airports ("referral boundaries"). The City of Sunnyvale is not within an ALUC referral boundary.

The ALUC also reviews the general and specific plans prepared by local agencies (including Sunnyvale) for consistency with the ALUC plan. Recommendations made by the ALUC are advisory in nature to the local jurisdictions, not mandatory.

Sunnyvale Authority

Noise Ordinance
Chapter 19.24 (Operating Standards) of the Sunnyvale Municipal Code contains the City's Noise Standards. The noise standards were adopted in 1963 and revised in 1995. The noise regulations pertain to operational noise, hours of operation of powered equipment and delivery hours for commercial and industrial businesses adjacent to properties with residential zoning. Other single-event noises such as

construction, loudspeaker, nuisance and animal noises are regulated by different sections of the Municipal Code (see below) or by State Law.

Operational Noise

The Sunnyvale Municipal Code, Section 19.24.020(b) regulates operational noise. The section states:

- Operational noise shall not exceed 75dBA at any point on the property line of the premises upon which the noise or sound is generated or produced; provided, however, that the noise or sound level shall not exceed 50dBA during the nighttime or 60dBA during daytime hours at any point on adjacent residentially zoned property. If the noise occurs during the nighttime hours and the enforcing officer has determined that the noise involves a steady, audible tone such as a whine, screech or a hum, or a staccato or intermittent noise (e.g., hammering) or includes music or speech, the allowable noise or sound level shall not exceed 45dBA.

Daytime / Nighttime Hours

The Sunnyvale Municipal Code defines daytime as the period from 7am to 10pm, daily, and nighttime as the period from 10pm to 7am daily.

Powered Equipment

Powered equipment is defined in the Sunnyvale Municipal Code as:

- a motorized device powered by electricity or fuel used for construction, demolition, property or landscape maintenance, and repairs. Powered equipment includes but is not limited to: lawn mowers, edgers, leaf blowers, parking lot sweepers, saws, sanders, motors, pumps , generators, blowers, fans, wood chippers, vacuums, and nail guns.

The Sunnyvale Municipal Code limits the use of powered equipment that is used on a temporary, occasional or infrequent basis to daytime hours when used on a property that is adjacent to a residentially zoned property.

The Sunnyvale Municipal Code limits the use of powered equipment that is used on a temporary, occasional or infrequent basis to daytime hours (7am to 10pm, daily) when used on a property that is adjacent to a residentially zoned property.

Deliveries

The Sunnyvale Municipal Code regulates deliveries to commercial and industrial establishments that are adjacent to residentially zoned property to daytime hours (7am to 10pm, daily). This requirement is imposed on all businesses established or relocated after February 1, 1995. "Deliveries" include the use of motorized vehicles other than automobiles or trains.

Nuisance Regulations

The nuisance regulations in Chapter 19.24 of the Sunnyvale Municipal Code states in general terms that the owner or occupant of a property shall not permit any activity which creates a nuisance. "Noise" is listed as one of the several ways to create a nuisance.

Sunnyvale Municipal Code states that it is unlawful for any person to keep an animal that becomes a nuisance (including dogs that bark repeatedly).

Construction Noise

Hours of construction are regulated by the administrative provisions of the Uniform Building Codes, which Sunnyvale adopts by reference every three years. See Sunnyvale Municipal Code Chapter 16.08.

Loudspeaker Noise

Sunnyvale Municipal Code, Section 9.48.010 regulates the hours of operation of sound from loudspeakers projecting out of buildings.

Animal Noises

Sunnyvale Municipal Code, Section 6.16.015(b) states that it is unlawful for any person to keep an animal that becomes a nuisance (including dogs that bark repeatedly).

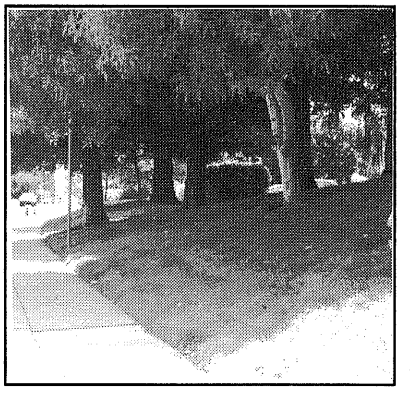
Land Use Decisions

The City of Sunnyvale exercises indirect noise control through land use and transportation planning, and direct control through the zoning code requirements. Decisions about the type, location and intensity of land uses affect the

amount of noise generated and the kinds of transportation facilities needed to support those uses. Decisions about roadway location, design, capacity and traffic management techniques all affect noise levels. Competing community goals need constant evaluation to determine the most appropriate balance of land use and transportation decisions.

Discretionary Land Use Permits

During the review of a discretionary land use permit, staff may determine that there are noise issues associated with a proposed project. Staff may require that the applicant arrange for a professional acoustical engineer to conduct a study of the potential noise impacts from the development or of existing noise on the development and potential mitigation measures that may be appropriate. The scope of this study needs to assure sufficient time and reasonable locations for acoustical readings.



Examples of noise mitigation techniques include the use of berms.

Discretionary land use permits issued by the City can contain conditions of approval relating to noise mitigation that minimize the noise impacts of a use on an adjacent property. Examples of noise mitigation techniques include: zoning district setbacks; berms; landscaping; sound walls; incorporating noise mitigation materials into the design of a building and limiting the hours of operation, deliveries, and parking lot sweeping; and limiting or prohibiting the use of loudspeakers on a property.

Advocacy

Sunnyvale can advocate noise protection in the land use and transportation plans and projects of neighboring cities, the County, and state and federal agencies. Of particular need is to monitor the noise impacts and mitigation of potential roadway improvement plans.

Overview of Sunnyvale Noise Conditions

Transportation noise from cars, trucks, buses, aircraft and trains are the major sources of noise in Sunnyvale. Transportation noise causes "conditionally acceptable" and "unacceptable" (as defined by the *"State Noise Guidelines for Land Use Planning"*, see Table 2 of this Sub-Element) noise levels in many parts of the City.

Despite the exposure that Sunnyvale residents have to transportation noise, most existing and future land uses comply with current state guidelines and federal noise standards.

In addition to transportation noise, single-event and operational noises (community noises) are frequent. Despite the exposure that Sunnyvale residents have to transportation noise, most existing and future land uses comply with current state guidelines and federal noise standards. These guidelines and standards are discussed in the *"Regulating Noise"* section of this Sub-Element. Existing and potential future noise conditions from transportation, single-event and operational noises are discussed in detail below.

Noise Condition Map

The Noise Condition Map for Sunnyvale consists of two, superimposed maps (see Appendix A).

Noise Exposure Map - To develop the Noise Exposure Map, the Ldn was measured at a distance of 50 feet from the edge of all the major roadways. The roadway was then color-coded depending on the outcome of the measurement. The Noise Exposure Map is a convenient visual aide in determining the level of noise resulting from roadway traffic and can assist in making land use decisions.

Noise Contour Map - Shows noise contours for the year 2010 for major roadway and railroad noise sources in Sunnyvale. The noise contours represent **average**[3] noise levels over a 24-hour period. Noise levels at any instant may be higher or lower.

The base map for the Noise Condition Map is on a Geographic Information System (GIS) map of the City. The GIS base map is connected to a data base which indicates land use, zoning and general plan designation for each land parcel in Sunnyvale. Using the GIS as a base map for the Noise Condition Map facilitates an accurate count of land parcels exposed to various noise levels. Prior versions of the Noise Condition Map did not use the GIS system for the base map.

The Noise Condition Map can be used to:

- identify areas where existing uses are impacted by excessive noise;
- determine if future land uses are compatible with their noise environments. If the use would be exposed to excessive noise, the City could require a detailed noise study (the Noise Condition Map does not take the place of a detailed study) that

[3] The Noise Contour Map consists of average (Ldn) noise levels whereas instantaneous readings are used for the purpose of enforcing the noise regulations in the Sunnyvale Municipal Code.

shows existing and future noise levels and recommends ways to achieve acceptable noise levels; and

- implement Title 24 of the California Code of Regulations (Noise Insulation Requirements).

TECHNICAL REPORT FOR NOISE CONDITION MAP

A technical report which includes the methodology and data used to develop the Noise Condition Map is available for review at the Department of Community Development. The report includes survey techniques; noise monitoring locations, times, and data; traffic data used to develop the noise contours; and a table of noise exposure to single-family residences by noise source. The number of single-family homes exposed to various noise levels was counted using the GIS database. More than 50% of a single-family land parcel had to be included within the noise contour before it was included in that particular noise level category. Multi-family residences were not tabulated for noise exposure by noise source because of the difficulty in determining how many units in a building are exposed to a particular noise source. For example, a two-story, 24 unit apartment building may have as few as four, or as many as 12 units exposed to a noise source, depending on the arrangement of building(s) on the site. In addition, sound walls typically required for multi-family developments mitigate the noise exposure on the property.

METHODOLOGY USED TO DEVELOP THE NOISE CONTOUR MAP

The noise contours were developed based on existing and predicted year 2010 traffic conditions for major roadways in Sunnyvale, and calibrated with noise measurements taken in June 1996. The City's Traffic Engineering Division provided existing and predicted year 2010 average daily trip data for major roadways in Sunnyvale. Average daily trip data, in combination with speed limits, is used to establish Ldn distances (60, 65, and 70) from the centerline of the

each major roadway. The short and long-term noise measurements are then used to calibrate and verify the contour distances resulting from the traffic data information.

NOISE MEASUREMENT LOCATIONS

Noise measurements were taken to develop the Noise Condition Map, and consisted of four long-term (24 hour) at the following locations:

- near the CALTRAIN railroad tracks (Evelyn Avenue near Sunset Avenue);
- near State Highway 85 (The Dalles and Bernardo Avenue);
- along Wolfe Road (near Elizabeth Way); and
- near Lawrence Expressway (near Sandia Avenue).

In addition, 16 short-term (10-15 minute) noise measurements were taken between the hours of 9:00am and 5:30pm at the following locations:

- corner of Bryan and Bayview Avenues;
- near Central Expressway and Sunnyvale Avenue along Arques Avenue;
- Mary Avenue, between Evelyn and Fremont Avenues;
- Sunnyvale-Saratoga Road, between El Camino Real and Fremont Avenue;
- South Mary Avenue, between Fremont Avenue and Homestead Road;
- Kennewick Drive, near Homestead Road;
- Fremont Avenue at La Bella Avenue;
- Homestead Road, between Hollenbeck Avenue and Sunnyvale-Saratoga Road;
- Homestead Road, between Wolfe Road and Sunnyvale-Saratoga Road;
- Sunnyvale-Saratoga Road south of Harwick Way;
- Silverlake Dive at Lakedale Way;
- Lakedale Way near Lawrence Expressway;
- Lakewood Drive near U.S. Highway 101;
- Caribbean Drive near the sewage treatment plant;

- Sandia Avenue and Wildwood Avenue, near U.S. Highway 101; and
- San Rafael Street and East Ahwanee Avenue, near U.S. Highway 101.

MOFFETT FEDERAL AIRFIELD - POTENTIAL NOISE CONDITIONS FOR YEAR 2010

Potential future noise impacts of Moffett Federal Airfield (MFA) are shown in Appendix B, *"Mitigated Year 2010 Forecast Noise Exposure Conditions (CNEL)"*. The potential noise impacts are based on the mitigated 2010 forecast of aircraft operations contained in the Comprehensive Use Plan (CUP) developed by NASA in 1994. The mitigation measures include removing noisy helicopters from the fleet mix, modifying the helicopter flight patterns, and runway usage and noise attenuation for new or modified wind tunnels that would result in less-than- significant noise impact levels. The CUP is discussed in the *"Regulating Noise at Moffett Federal Airfield"* section of this Sub-Element.

The noise contours in Appendices A and B show Ldn contours for roads and the railroad, and CNEL contours for Moffett Federal Airfield. Why use both noise descriptors? The national trend is to use Ldn to describe average noise levels, but California law requires CNEL for airports. Since Ldn and CNEL readings are almost identical, they are interchangeable.